In the Claims:

1-12 (Cancelled).

13. (Currently Amended) A method for locating a metallic object or for identifying defects thereon, comprising the steps of:

energizing at least one transmitting coil with an AC voltage for transmitting a carrier signal to the object and receiving at least one of an essentially amplitude-modulated received signal and phase-modulated received signal resulting from the carrier signal by means of at least one receiving coil, and

demodulating the received signal using a computer and a Fourier or wavelet transformation method using a predefined number of digitally determined measurement results,

calculating at least one of an associated magnitude value and phase value for the frequency of the carrier signal, and

using the calculated at least one of an associated magnitude and phase value as a direct measure of one of a present signal strength and a phase angle of the demodulated received signal;

wherein said demodulating step comprises multiple demodulating of the received signal using the computer and the Fourier or wavelet transformation method; wherein said calculating step also comprises calculating of a spectrum when the at least one of associated magnitude values and phase values are calculated for frequencies of the carrier signal; and wherein at least one additional frequency component of said spectrum is used with the calculated at least one of the magnitude and phase values as said direct measure one of the present signal strength vector and phase angle of the demodulated received signal.

14. (Canceled).

15. (Currently Amended) The method as claimed in claim 13, [[14,]] wherein temporally successive Fourier or wavelet transformations are carried out based on sets of, in each case, at least 3 progressively determined measured values.

16. (Currently Amended) The method as claimed in claim 13, [[14,]] wherein temporally successive Fourier or wavelet transformations are carried out based on sets of, in each case, at least 9 progressively determined measured values.

17. (Previously Presented) The method as claimed in claim 15, wherein sequences of temporally mutually superposed progressively determined measured values are used.

18. (Previously Presented) The method as claimed in claim 13, wherein at least 2 samples are detected and processed per full wave of the carrier signal.

19. (Currently Amended) A method for locating a metallic object or for identifying defects thereon, comprising the steps of:

energizing at least one transmitting coil with an AC voltage for transmitting a carrier signal to the object and receiving at least one of an essentially amplitude-modulated received signal and phase-modulated received signal resulting from the carrier signal by means of at least one receiving coil, and

demodulating the received signal using a computer and a Fourier or wavelet transformation method using a predefined number of digitally determined measurement results,

calculating at least one of an associated magnitude value and phase value for the frequency of the carrier signal, and

using the calculated at least one of an associated magnitude and phase value as a direct measure of one of a present signal strength and a phase angle of the demodulated received signal;

~~The method as claimed in claim 13,~~ wherein intermittent data acquisition is performed with less than 1 sample being detected and processed per full wave of the carrier signal.

20. (Canceled).

21. (Currently Amended) A method for locating a metallic object or for identifying defects thereon, comprising the steps of:

energizing at least one transmitting coil with an AC voltage for transmitting a carrier signal to the object and receiving at least one of an essentially amplitude-modulated received signal and phase-modulated received signal resulting from the carrier signal by means of at least one receiving coil, and

demodulating the received signal using a computer and a Fourier or wavelet transformation method using a predefined number of digitally determined measurement results,

calculating at least one of an associated magnitude value and phase value for the frequency of the carrier signal, and

using the calculated at least one of an associated magnitude and phase value as a direct measure of one of a present signal strength and a phase angle of the demodulated received signal; ~~The method as claimed in claim 20,~~

comprising the additional step of digitally filtering at least one of the signal to be demodulated and the harmonics thereof, wherein the digitally filtering is a digital low-pass filtering effect is provided for the demodulated signal using a mathematically assigned digital low-pass filter that has a width that is varied as a function of the number of digitally determined measured values being fed to a respective Fourier or wavelet transformation, so that a small number of measured values effects a larger filter width and a larger number of measured values effects a smaller filter width of the mathematically assigned digital low-pass filter.

22. (Previously Presented) The method as claimed in claim 21, wherein the speed of the object along the at least one transmitting coil is measured with a speed sensor and the number of digitally determined measurement results is chosen to be one of inversely proportional to the frequency of a frequency signal output by the speed sensor, and directly proportional to pulse lengths output from said speed sensor.

23. (Canceled).